

What is claimed is:

1 1. A method for performing DMA transfers with dynamic
2 descriptor structure, comprising the steps of:
3 creating a new chain of descriptors each including an
4 end-of-chain entry set to a false value except a
5 dummy descriptor at the end of the new chain
6 having the end-of-chain entry set to a true
7 value, wherein each of the descriptors excluding
8 the dummy descriptor further comprises one or
9 more parameters identifying data to be
10 transferred and a link pointer specifying a next
11 descriptor within the new chain;
12 appending the new descriptor chain to a previous
13 descriptor chain, if any, by transferring the
14 parameters and the link pointer of the first
15 descriptor within the new descriptor chain to a
16 dummy descriptor of the previous descriptor
17 chain;
18 changing the end-of-chain entry of the dummy descriptor
19 within the previous descriptor chain from the
20 true value to the false value;
21 fetching the descriptor specified by a next address;
22 determining whether the end-of-chain entry of the
23 currently fetched descriptor is set to the false
24 value;
25 if so, updating the next address with the link pointer
26 of the currently fetched descriptor; and
27 transferring the data identified in the parameter of
28 the currently fetched descriptor.

1 2. The method as recited in claim 1 further comprising
2 the step of issuing a command after the new descriptor chain
3 is appended to the previous descriptor chain.

1 3. The method as recited in claim 2 further comprising
2 the step of causing the next address to point to the first
3 descriptor within the new descriptor chain before the
4 issuing step.

1 4. The method as recited in claim 2 further comprising
2 the step of ignoring the issued command if the data transfer
3 identified in the previous descriptor chain is being
4 performed.

1 5. The method as recited in claim 2 further comprising
2 the step of accepting the issued command if there are no
3 more data transfers identified in the previous descriptor
4 chain.

1 6. The method as recited in claim 1 wherein the
2 fetching step through the transferring step are executed in
3 a loop until the end-of-chain entry with the true value is
4 detected in the determining step.

1 7. The method as recited in claim 5 wherein, after
2 acceptance of the issued command, the fetching step through
3 the transferring step are executed in a loop until the end-
4 of-chain entry with the true value is detected in the
5 determining step.

1 8. A method for performing DMA transfers under control
2 of a DMA controller and a processor, the method comprising
3 the steps of:
4 creating a chain of descriptors each including an end-
5 of-chain entry set to a false value except a
6 dummy descriptor at the end of the descriptor
7 chain having the end-of-chain entry set to a true
8 value, wherein each of the descriptors excluding
9 the dummy descriptor further comprises one or
10 more parameters identifying data to be
11 transferred by the DMA controller and a link
12 pointer specifying a next descriptor within the
13 descriptor chain;
14 causing a starting address to point to the first
15 descriptor within the descriptor chain;
16 issuing a start command by the processor;
17 accepting the start command by the DMA controller which
18 is in an idle state;
19 replacing a next address with the starting address;
20 from the descriptor chain, fetching the descriptor
21 specified by the next address;
22 determining whether the end-of-chain entry of the
23 currently fetched descriptor is set to the false
24 value;
25 if so, updating the next address with the link pointer
26 of the currently fetched descriptor;
27 transferring the data identified in the parameters of
28 the currently fetched descriptor; and

29 repeating the fetching through the transferring steps
30 until the end-of-chain entry with the true value
31 is detected in the determining step.

1 9. The method as recited in claim 8 further comprising
2 the steps of:
3 creating a new chain of descriptors;
4 appending the newly created descriptor chain to the
5 previously created descriptor chain by
6 transferring parameters and a link pointer of the
7 first descriptor within the newly created
8 descriptor chain to the dummy descriptor of the
9 previously created descriptor chain;
10 changing the end-of-chain entry of the dummy descriptor
11 within the previously created descriptor chain
12 from the true value to the false value;
13 issuing a resume command by the processor; and
14 ignoring the resume command if the data transfer
15 identified in the previously created descriptor
16 chain is being performed by the DMA controller.

1 10. The method as recited in claim 9 further comprising
2 the step of accepting the resume command by the DMA
3 controller if there are no more data transfers identified in
4 the previously created descriptor chain.

1 11. The method as recited in claim 10 wherein, after
2 acceptance of the resume command, the fetching through the
3 transferring steps are resumed in a loop until the end-of-
4 chain entry with the true value is detected in the
5 determining step.

1 12. A method for performing DMA transfers under control
2 of a DMA controller and a processor, the method comprising
3 the steps of:
4 creating a chain of descriptors each including an end-
5 of-chain entry set to a false value except the
6 last descriptor within the descriptor chain
7 having the end-of-chain entry set to a true
8 value, wherein each of the descriptors further
9 comprises one or more parameters identifying data
10 to be transferred by the DMA controller and a
11 link pointer specifying a next descriptor within
12 the descriptor chain;
13 causing a next address to point to the first descriptor
14 within the descriptor chain;
15 issuing a command by the processor;
16 accepting the issued command by the DMA controller
17 which is in an idle state;
18 from the descriptor chain, reading the descriptor
19 specified by the next address;
20 transferring the data identified in the parameters of
21 the currently read descriptor;
22 determining whether the end-of-chain entry of the
23 currently read descriptor is set to the false
24 value;
25 if so, updating the next address with the link pointer
26 of the currently read descriptor; and
27 repeating the reading through the updating steps until
28 the end-of-chain entry with the true value is
29 detected in the determining step.

1 13. The method as recited in claim 12 further
2 comprising the steps of:
3 creating a new chain of descriptors;
4 appending the newly created descriptor chain to the
5 previously created descriptor chain by causing
6 the link pointer of the last descriptor within
7 the previously created descriptor chain to point
8 to the first descriptor within the newly created
9 descriptor chain;
10 changing the end-of-chain entry of the last descriptor
11 within the previously created descriptor chain
12 from the true value to the false value;
13 issuing the command by the processor; and
14 ignoring the issued command if the data transfer
15 identified in the previously created descriptor
16 chain is being performed by the DMA controller.

1 14. The method as recited in claim 13 further
2 comprising the steps of:
3 if there are no more data transfers identified in the
4 previously created descriptor chain:
5 accepting the issued command by the DMA
6 controller;
7 fetching the descriptor specified by the next
8 address; and
9 replacing the next address with the link pointer
10 of the currently fetched descriptor.

1 15. The method as recited in claim 14 wherein, once the
2 issued command is accepted by the DMA controller, the

Client's ref.: P53US

Our ref.: 0751-A30159US/final/M.F.Lin/Steve

3 reading step through the updating step are executed in a
4 loop until the end-of-chain entry with the true value is
5 detected in the determining step.